

## Arctic Smorgasbord

### Overview

Students discover how different organisms that live in the Arctic depend on each other and what might happen to the food web if one or more organisms disappears from it. Students will build an Arctic food web.

**Grade Level:** High School

### Objectives

Students will learn that:

- Organisms are part of a global food web and linked to each other and their physical environments through the transfer and transformation of energy.
- All animals must eat other organisms to obtain energy for processes such as cell growth, reproduction, movement, and respiration.
- Most animals do not eat just one thing, or are eaten by only one thing.
- A food web is a result of complex feeding relationships among organisms that interconnect all organisms in a community.

New vocabulary words: primary producers, primary consumers, herbivore, secondary consumers, carnivores, tertiary consumers, predators, and decomposers.

### Standards

This lesson plan was developed prior to finalization of the Next Generation Science Standards and alignment of the Alaska Science Standards to them. When those standards are available, these activities will be re-aligned.

#### National Science Education Standards:

##### Grades 9-12

Content Standard C: Life Science:

- e. Matter, energy, and organization in living systems
- f. Behavior of organisms

#### Other Standards:

Alaska State Standards:

SC3 Students develop an understanding that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy.

[Grade 10] SC3. 2 exploring ecological relationships (e.g., competition, niche, feeding relationships, symbiosis)(Local)

## Materials

- Arctic food web cards
- Small poster board or construction paper
- Tape
- Markers

## Preparation

Photocopy/print copies of the arctic food web cards, one set for each group of students. Optional: cut out cards prior to class.

## Procedure

1. Review the concepts of food webs and food chains with the students
2. Divide students into groups and give each group a set of cards.
3. Have students build food webs, using the information on the cards. They should start with the producers and work up to the top consumers. Remind them to study the relationships carefully.
4. When they are satisfied with the placement of the organisms, they should secure their cards onto the poster board/construction paper with the tape and draw arrows showing the direction of the energy flow.
5. Have student groups play the food web game with another group to see how well they understand the feeding relationships of the community. These are the instructions for the game:
6. The purpose of the game is to "crash" your opponents' food web by removing as many cards as possible from their food web in 3 turns.
7. In this game, you cannot eliminate the primary producer – only consumers.
8. Start the game by removing an organism from your opponents' food web. Your group will keep the card and discuss what happened to the food when you eliminated that organism. If there are any animals that feed ONLY on the organism you took out (i.e. they have no other food source) you may take those cards too.
9. The other team then removes one (or more) cards from your food web.
10. The winning team is the one who gets the most cards from their opponents in three turns.

## Assessment

1. Which organism depicted in this food web is a primary producer? Where do the producers obtain their energy?
2. Which organisms in this food web are primary consumers? Which one is the top consumer and why?
3. How do you think tiny krill provide enough energy to sustain whales?
4. What would happen if krill were to disappear from the ecosystem?
5. Which organisms have the most selective diets? Is this an advantage or disadvantage?

## Extensions

1. Have students add humans to the web and discuss their role.
2. Have students research "substitution" prey items (i.e. sculpin for Guillemots, smooth and rayed nut clams for Eiders) and discuss the ramifications of substitutions for the predators.

**Credits:** Dana Hilchey, Barrow High School, Barrow, Alaska. Adapted from "Polar Feasts!" Polar Science and Global Climate (2010), Pearson Education Limited.

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